

V.

PROJECT ALTERNATIVES

A. INTRODUCTION

This Draft Program EIR provides a discussion of alternatives to the proposed project, as required by CEQA. Alternatives include measures for attaining the objectives of the proposed project and provide a means for evaluating the comparative merits of each alternative. A “No Project” alternative must also be evaluated. The range of alternatives must be sufficient to permit a reasoned choice, but need not include every conceivable project alternative. CEQA Guidelines §15126.6(a) specifically notes that the range of alternatives required in a CEQA document is governed by a “rule of reason” and only necessitates that the CEQA document set forth those alternatives necessary to permit a reasoned choice. The key issue is whether the selection and discussion of alternatives fosters informed decision-making and meaningful public participation. A CEQA document need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative. ARB’s certified regulatory program does not impose any greater requirements for a discussion of project alternatives in an environmental assessment than is required for an EIR under CEQA.

A CEQA document should identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and explain the reasons underlying the lead agency’s determination (CEQA Guidelines §15126.6(a)). The NOP/IS prepared for the SCM included seven concepts that could possibly be further developed into project alternatives. These concepts, which were previously identified by industry representatives during an ARB public consultation meeting in August 1998, include a low vapor pressure exemption, performance-based standards, reactivity-based standards, product line averaging, regional regulation, seasonal regulation, and modification of the VOC content limits/final compliance deadlines. One of the concepts identified in the NOP/IS, product line averaging, is considered a feasible alternative but is not included in the SCM at this time. Following is a discussion of the various alternatives considered by the staff.

B. ALTERNATIVES REJECTED AS INFEASIBLE

Upon further consideration and evaluation, some of the project alternatives originally identified by industry and included in the NOP/IS have been determined to be infeasible as the basis for a specific project alternative. These concepts and the rationale for rejecting them as infeasible are discussed in the following subsections.

1. Performance-Based Standards

Members of industry originally raised the concept for a performance-based rule provision or project alternative. Rather than establish lower VOC content requirements for specified categories of coatings, this alternative would establish emission standards based on performance standards such as emissions per area covered or coating durability.

This alternative was rejected as infeasible because no consensus could be reached on how to create standards to cover the multitude of coatings formulations with varying performance characteristics. For example, there are different performance characteristics for different coatings with different end-uses. In addition, one manufacturer may believe that one particular performance characteristic is more important than a second characteristic, while a different manufacturer may believe that the second characteristic is more important. Alternatively, a third manufacturer may believe that an entirely different characteristic is the most important. Similarly, one manufacturer may believe that a particular “score” on one test is adequate, while another manufacturer may believe that a higher “score” is necessary. Agreement could not be reached concerning the appropriate standards for each type of coating technology. As a result, this alternative has been dropped from further consideration.

2. Seasonal Regulation

Under this alternative, the VOC content limits proposed for various coatings in the SCM would only be in effect during the “high ozone season” (typically the summer months). During the “low ozone season” (typically the winter months), coatings formulators could sell and distribute, and contractors and do-it-yourselfers could use, coatings with higher VOC contents.

ARB staff has determined that this alternative is infeasible because, as discussed below, it is too difficult to implement and enforce. Based on discussions with industry representatives, one problem is that it may be difficult for coatings formulators and distributors to manage architectural coatings stocks to ensure that only complying coatings are sold during the high ozone season. In addition, coatings are applied by thousands of individual painters, and it is simply not realistic to expect all of these individual applicators to know when it is “legal” to apply a particular can of paint, and when it is not. Contractors working on projects that span seasons could be put in jeopardy. Even for individuals who know what the rules are, there would be considerable incentive not to follow them in situations where a person already has in their possession a can of high-VOC paint that will do the job perfectly well, and the individual is faced with the prospect of taking the time to drive to a paint store and spend additional money to purchase complying low-VOC paint. Human nature being what it is, it is likely that many individuals would opt to use up the paint they have on hand, regardless of what the air quality rules may be. Finally, effective enforcement of such a rule at thousands of individual, constantly changing painting sites would be extremely difficult. Districts would have to commit significant additional enforcement resources, and many districts would simply not be able to do this.

In addition, VOC emissions contribute to year-round PM levels, and almost the entire State violates California’s PM₁₀ standard.

For all of the reasons discussed above, the “Seasonal Regulation” alternative is not considered to be a feasible alternative.

3. Regional Regulation

Under this alternative, areas within each district that do not have an ozone problem or contribute to the district’s ozone problem would be exempted from the VOC content requirements of the SCM. This alternative was rejected as infeasible for the reasons specified below.

To determine the viability of such an approach, a district would have to undertake ambient air quality modeling (*e.g.*, urban airshed model (UAM)). However, this type of geographical shift alternative would be extremely difficult to model because the UAM is dependent on meteorological conditions. For example, depending on the meteorological conditions used, it would be difficult to determine whether or not an exceedance in one source receptor area (SRA) was due to the emissions sources in that SRA or the result of wind conditions in which emissions from an upwind SRA were transported to a second SRA, causing a violation in the second SRA.

Even if one could make a reliable technical determination that certain areas within a district could be exempted from VOC regulations without impacting air quality, there remains the very difficult problem of actually enforcing such a scheme. Architectural coatings are distributed from a large number of retail stores, and are used in thousands of individual locations throughout each district. A regional deregulation scheme might have to rely on maps or some other cumbersome system to depict which areas coatings could be used in, and which they could not. Such a system would have severe enforcement problems, for the same reasons discussed in the previous section on “Seasonal Regulation.”

In addition, VOC emissions contribute to year-round PM levels, and almost the entire State violates California’s PM₁₀ standard.

For all of the reasons discussed above, the “Regional Regulation” alternative is not considered to be a feasible alternative.

4. Exceedance Fees

This alternative was not listed in the NOP as an alternative that would be discussed in the Draft Program EIR. However, staff decided to include a discussion in response to a comment on the NOP received from the National Paint & Coatings Association. The comment suggested that the Program EIR should explore an option to allow purchases of noncompliant coatings on payment of a fee, similar to the system that exists in the national AIM coatings rule.

The commenter is referring to the Exceedance Fees allowed by section 59.403 of the national AIM rule. This section basically allows coatings manufacturers and importers to sell coatings that exceed the applicable VOC limit in the AIM rule, if they pay a fee of \$0.0028 per gram of excess VOC. Conceptually, such a fee is essentially a “pay-to-pollute” approach. The ARB has generally not supported such proposals in the past because they do nothing to bring the air into compliance with State and federal standards, and may actually hinder attainment efforts. The fundamental problem with allowing exceedance fees in the SCM is simply that such an approach could eliminate or substantially reduce the emission reductions expected from the SCM. In addition to this general problem with such proposals, the ARB staff is also concerned that the fee amount specified in the national AIM rule is not high enough to seriously discourage the manufacture and sale of high-VOC coatings. Finally, this approach would be difficult to enforce at a district-wide or statewide level, and would require extensive recordkeeping

requirements. Because of these problems, an exceedance fee approach is not considered to be a feasible alternative.

5. Low Vapor Pressure (Low Volatility) Exemption

Under this alternative, VOCs with low vapor pressures (*i.e.*, “low vapor pressure VOCs” or “LVP-VOCs”) would be exempted as VOCs in determining the overall VOC content of a coating. This alternative has been rejected as infeasible as described below.

a. Introduction

Volatility describes the tendency of a substance to evaporate and enter the atmosphere as a gas. Some compounds evaporate quickly (high volatility), while others volatilize slowly (low volatility). LVP-VOCs tend to volatilize (*i.e.*, evaporate) into the atmosphere more slowly than non-LVP-VOCs. An exemption for low volatility compounds in paint would make sense if it could be shown that there exists some vapor pressure threshold, below which a compound would not be volatile enough to evaporate and enter the atmosphere.

EL RAP (1998) contends that because of their low rates of volatilization and other chemical and physical properties, certain VOCs used in architectural coatings either never enter the atmosphere at all or, if they do enter the atmosphere initially, these VOCs do not remain in the atmosphere long enough to participate in ozone formation. Instead, it is claimed that these compounds are removed from the air by absorption onto building surfaces, pavement, soil, or vegetation, or through atmospheric removal by interaction with water vapor, dust, or other particulate matter.

EL RAP maintains that a useful measure of atmospheric availability is volatility, measured by vapor pressure. California and national consumer products regulations exempt compounds with vapor pressure at or below 0.1 mm Hg at 20° C. EL RAP claims that the ARB’s and the U.S. EPA’s reasoning for exempting such low volatility compounds from consumer products is that these “products often contain ingredients which are of extremely low volatility (*i.e.*, some ingredients evaporate at such a low rate that they do not enter the air to any appreciable degree).” EL RAP argues that because the consumer products regulations at the federal and state level have the exemption, therefore such an exemption should also be included in the SCM in order to achieve consistency with these regulations. The following cosolvents in waterborne latex coatings are named by EL RAP as low volatility compounds: ethylene glycol, propylene glycol, and Texanol® ester alcohol.

EL RAP argues that exempting these compounds from architectural coatings would reduce the emissions inventory for these coatings by about 30 percent. EL RAP maintains that an exemption would also provide formulation latitude necessary to continue developing high-performance waterborne coatings that would be required to sustain the market-driven conversion from solvent-borne to waterborne coatings. EL RAP concludes that this will result in reducing both emissions and potential ozone impacts.

The ARB staff has carefully evaluated all of these issues and concluded that it would not be

appropriate to include an LVP-VOC exemption in the SCM. The reasons for this conclusion are discussed below.

b. An LVP-VOC Exemption Would Not Achieve Regulatory Consistency

i. LVP-VOCs in the ARB Consumer Products Regulations and the U.S. EPA Consumer Products Regulation

The ARB Regulation for Reducing the Volatile Organic Compound (VOC) Emissions from Consumer Products (the “ARB consumer products regulation”: title 17, CCR, sections 94507-94517) contains an exemption for LVP-VOCs (see title 17, CCR, section 94510(d)). The Board first approved this exemption in 1990. As originally adopted, the exemption applied to any VOC which: (a) has a vapor pressure less than 0.1 mm Hg at 20° C, or (b) consists of more than 12 carbon atoms, if the vapor pressure is unknown.

It should be noted that in 1990, the original exemption was commonly referred to as the “low vapor pressure” or “LVP” exemption, but the terms “low vapor pressure” or “LVP” did not appear in the actual language of the consumer products regulation. The regulation was subsequently amended to add the term “LVP-VOC” to describe the compounds that were covered by the exemption.

On November 16, 1999, a number of modifications to the original definition went into effect. The definition of LVP-VOC was changed because the ARB developed a feasible and enforceable test method to determine LVP-VOCs in consumer products. The modified definition is as follows:

LVP-VOC means a chemical “compound” or “mixture” which contains at least one carbon atom and meets one of the following:

- (A) a vapor pressure less than 0.1 mm Hg at 20° C, as determined by ARB Method 310, or
- (B) is a chemical “compound” with more than 12 carbon atoms, or a chemical “mixture” comprised solely of “compounds” with more than 12 carbon atoms, and the vapor pressure is unknown; or
- (C) is a chemical “compound” with a boiling point greater than 216° C, as determined by ARB Method 310; or
- (D) is the weight percent of a chemical “mixture” that boils above 216° C, as determined by ARB Method 310.

For the purposes of the definition of LVP-VOC, chemical “compound” means a molecule of definite chemical formula and isomeric structure, and chemical “mixture” means a substrate comprised of two or more chemical “compounds” (see title 17, CCR, section 94508).

The U.S. EPA has also adopted a consumer products regulation which contains an LVP-VOC exemption. The U.S. EPA’s regulation, which was promulgated on September 10,

1998, was closely modeled after an earlier version of the ARB consumer products regulation (first approved by the ARB in 1990). Accordingly, the U.S. EPA's consumer products rule contains an LVP-VOC exemption that is similar to the earlier version of the ARB's LVP-VOC definition that is set forth above (see 40 CFR Part 59, Subpart C, Section 59.203(f)).

The U.S. EPA does not support an LVP-VOC exemption for architectural coatings. The U.S. EPA believes that, because Method 24 is available to measure the VOC content of architectural coatings, this method accounts for the volatility of solvents. Solvents that do not volatilize under Method 24 are not measured as VOC. Further, based on U.S. EPA indoor air studies cited below, the U.S. EPA maintains that virtually 100 percent of the VOC in paint is eventually emitted and is available to form ozone (U.S. EPA, 1998). In the preamble to the proposed national consumer products rule, the U.S. EPA states that, although a low volatility cutoff for consumer products was being proposed, this in no way alters the U.S. EPA's existing overall VOC policy, and does not set a precedent for other rules (U.S. EPA, 1996; see 61 FR 14535; April 2, 1996). Finally, U.S. EPA's long-standing reactivity policy is that a 0.1 mm Hg vapor pressure cutoff cannot be used in a VOC definition because this would exempt compounds of low volatility. This is because these low volatility compounds, under certain processes, would volatilize and participate in photochemical reactions (U.S. EPA, 1988).

ii. LVP-VOCs are not Exempted in the Architectural Coatings and Aerosol Paint Regulations

Although the ARB and the U.S. EPA consumer products regulations contain an LVP-VOC exemption, no similar exemption is contained in *any* of the current rules for architectural coatings or aerosol paints. The U.S. EPA has promulgated a final rule for architectural coatings which does not include an exemption for LVP-VOCs (see 63 FR 48848; September 11, 1998). Architectural coatings have also been regulated for many years in California by the local air pollution control and air quality management districts (districts). Seventeen districts currently have architectural coatings rules, and none of these rules contain an LVP-VOC exemption. The ARB has also adopted a regulation to regulate the VOC content in aerosol coating products (*i.e.*, "spray paint"; see title 17, CCR, section 94540 to 94555), and this regulation also does not contain an exemption for LVP-VOCs. In fact, ARB staff is not aware of any architectural coatings or aerosol paint regulation anywhere in the United States that contains an LVP-VOC exemption.

From the above discussion, it is apparent that including an LVP-VOC exemption in the architectural coatings SCM would not achieve regulatory consistency, because other regulations relating to architectural coatings and aerosol paint do not have such an exemption. The obvious question, however, is why this is so when the ARB and U.S. EPA consumer products regulations *do* have an LVP-VOC exemption. The short answer is that there are important differences between these types of regulations that justify different treatment for LVP-VOCs. These differences are explained in the following sections.

c. The History and Rationale for the LVP-VOC Exemption in the ARB Consumer Products Regulation

The current ARB consumer products regulation was adopted in several regulatory phases. After approval by the State Office of Administrative Law, the first phase (Phase I) became legally effective on October 21, 1991, and the second phase (Phase II) became legally effective on January 6, 1993. The LVP exemption was adopted as part of the Phase I regulatory action. A staff report, technical support document, and final statement of reasons were prepared for both Phase I and Phase II, and these rulemaking documents describe the purpose of the LVP-VOC exemption.

Basically, the LVP-VOC exemption was designed to account for the fact that in *some* product formulations, under certain conditions of use, some VOCs will evaporate very slowly or not at all due to low vapor pressures. Such low vapor pressure (LVP) compounds were described in the Phase I rulemaking record as less “emissive” than compounds with higher volatility. This means that in certain consumer products, due to the particular product formulation characteristics, some portion of the LVP compounds do not volatilize quickly enough to be emitted into the atmosphere under normal conditions of use. Compounds that are not emitted into the atmosphere (*i.e.*, do not evaporate) are of course not available to react in the atmosphere to form ozone. ARB staff recognized that whether or not a compound is emitted into the atmosphere is critically dependent not only on the vapor pressure of the individual compound, but also on: (1) the type of product in which the compound is used, (2) the particular characteristics of the product’s formulation, and (3) the way in which the product is actually used by consumers in the real world.

The staff reports and technical support documents cite some examples of products that contain LVP-VOC compounds. Examples that were cited are the high molecular weight resins used in hair sprays and floor polishes, the surfactants used in cleaners, and the heavy oils used in furniture polishes. For these products, it was clear to ARB staff that, while some portion of these LVP-VOCs would eventually evaporate and enter the atmosphere, some portion of these compounds would never evaporate. This can be illustrated by the example of the surfactants used in general purpose cleaners and bathroom and tile cleaners. The surfactants in these products are typically composed of LVP-VOCs. In normal use when such cleaners are used to wash surfaces, some of the more volatile VOCs in the cleaner quickly evaporate into the air, but some of the slower-evaporating VOCs (such as surfactants) are typically washed “down-the-drain” and into the sewer system. Once in the sewer system, scientific studies have demonstrated that some of the remaining VOCs will eventually leave the sewer system and enter the atmosphere through various mechanisms, such as: (1) stripping into the air during sparging and aeration caused by turbulence in the sewer system, or (2) adsorption onto wastewater solids and subsequent offgassing during dewatering and landfilling of those solids. However, these studies also demonstrate that a substantial proportion of the “down-the-drain” VOCs will never be emitted, because these VOCs will biodegrade in the sewer system before significant amounts of the VOCs can evaporate and enter the atmosphere.

Based on this research, ARB staff recognized that LVP-VOCs do contribute to ozone formation in the atmosphere, but that since some portion of LVP-VOCs in some consumer products will not be emitted from certain product formulations, LVP-VOCs as a class will contribute *less* to ozone formation than higher-volatility VOCs in certain product categories. ARB staff also wanted to streamline the regulatory development of the consumer products

regulation, minimize the impacts on industry, and provide formulation flexibility to manufacturers. It was felt that all of these goals could be accomplished by including the LVP-VOC exemption in the consumer products regulation, and thereby concentrate the regulatory effort on the higher volatility VOCs that were of the most concern for air quality. The language of the LVP-VOC exemption was designed to provide a simple way to distinguish the compounds that were of less regulatory concern, and were thus to be exempted for those product categories regulated under the Consumer Products Regulation. The LVP language incorporated a vapor pressure “cutoff” of 0.1 mm Hg (at 20°C) because that number was the limit of instrument detection at the time. However, it should be noted that the vast majority of LVP-VOCs staff was aware of during the Phase I and II rule development had vapor pressures that were much lower than 0.1 mm Hg (calculated).

When Phase I and Phase II were developed, ARB staff believed that the LVP exemption would be used only for the very limited number of LVP compounds that were being used in certain categories of consumer products in the early 1990s. For example, the waxes, resins and other solids in existing products would continue to be used in reformulated products. Staff did not anticipate that the consumer products industry would develop new solvents (*i.e.*, certain liquid hydrocarbon distillate mixtures) that would technically be able to qualify for the LVP exemption. In consumer products, solvents are used primarily to dissolve, or act as a carrier for, the active ingredient. In some products, such as brake cleaners, the solvent can be the active ingredient. The LVP exemption was not originally designed to provide an exemption for solvents used in consumer products. It was also not designed to apply to the solvents used in architectural coatings (which were specifically excluded from the definition of “consumer products” under Health and Safety Code section 41712). At the time, the ARB staff was not aware of any LVP compounds that functioned as a solvent, and were being used in the product formulations proposed for regulation under the Consumer Products Regulation.

After Phase I and Phase II became legally effective, ARB staff learned that new solvents claiming LVP status, such as hydrocarbon distillate mixtures, had been developed and were being used by consumer products manufacturers in some reformulated products. Hydrocarbon distillate mixtures are typically mixtures containing dozens to hundreds of compounds that cannot be easily separated into individual pure compounds and allow for testing of the vapor pressure of the individual compounds. These solvents are being used to replace some of the regulated VOC solvents in products, in order to take advantage of the LVP exemption and meet the VOC standards in the ARB Consumer Products Regulation. In fact, the ARB plans to include the emissions from these hydrocarbon distillate mixtures in the updated consumer products inventory.

LVP-VOC solvents are very different from many other types of LVP-VOCs, many of which are waxy solids at room temperature. ARB staff expects that all or nearly all of these LVP solvents used in consumer products will volatilize, enter the atmosphere, and be available to participate in photochemical reactions leading to the formation of ozone. A contact at the U.S. EPA’s Air and Energy Engineering Research Laboratory (Sparks, 1991) believes that all the VOC emissions from consumer products reach the outdoors via air exchange. In certain studies where known emissions of VOCs from certain consumer products are allowed to enter a room, although some VOCs attach to surfaces, they are eventually re-emitted. Further, the

concentrations in indoor air decay over time as the emissions are removed via air exchange. Further discussion of these indoor “sink” effects can be found in section e, below.

Although the LVP-VOC exemption was designed in part to account for the lesser volatility of LVP compounds, the LVP-VOC exemption does not have anything to do with the potential reactivity of LVP-VOCs once they have evaporated and entered the atmosphere. The reactivity of VOCs is a separate concept from a compound’s volatility. While “volatility” describes a compound’s tendency to evaporate and enter the atmosphere as a gas, a compound’s “reactivity” refers to the compound’s tendency to react with other compounds to form ozone, once the compound has entered the atmosphere and is available to participate in ozone-forming reactions. In the ARB Consumer Products Regulation, the definition of the term “VOC” (in section 94508, title 17, CCR) specifically excludes compounds that do not react to form ozone in the atmosphere, or have low reactivity. This exemption in the VOC definition—not the LVP-VOC exemption—is how the regulation excludes compounds that are non-reactive or low in reactivity, and thus do not need to be regulated to order to reduce ozone.

d. LVP-VOCs Used in Architectural Coatings

Some ingredients found in architectural coatings meet the definition of an LVP-VOC, as that term is defined in the ARB consumer products regulation. Before proceeding further, it is useful to identify the specific compounds used in architectural coatings that meet the definition of a LVP-VOC, and would therefore be excluded from regulation if an LVP-VOC exemption were to become part of the SCM.

There are three general categories of compounds found in architectural coatings: resins, pigments, and solvents. Typically, some of the compounds in each category are LVP-VOCs, and some compounds are non-LVP-VOCs. For example, most of the pigments are solid material that qualify as LVP-VOCs and should not evaporate under Method 24 (as explained in section f, below.) Some of the solvents are LVP-VOCs, and others are non- LVP-VOCs. Table V-1 below lists a few of the solvents listed in the ARB survey (ARB, 1999c) that ARB staff believes would qualify as LVP-VOCs, with their relative rank in overall ingredients in waterborne architectural coatings.

Total use of these compounds is reported at more than 21 million pounds, or about five percent of the reported ingredients, excluding water, used in waterborne coatings. The point is, by requesting an LVP-VOC exemption for architectural coatings, manufacturers are requesting an exemption for a large volume of solvents that are used extensively in architectural coatings. In fact, as mentioned above, EL RAP believes that an LVP-VOC exemption would cover 30 percent of the solvents used in architectural coatings. So if an exemption were granted for LVP-VOCs, the negative impact on air quality could be severe if any significant amount of these LVP-VOCs would enter the atmosphere and participate in photochemical ozone reactions.

TABLE V-1
LVP-VOC SOLVENTS IN ARB ARCHITECTURAL COATINGS SURVEY

Compound	Rank in Waterborne Coatings
2,2,4-trimethyl-1,3-pentanediol isobutyrate (Texanol®)	6
Propylene glycol	8
Ethylene glycol	9
2-(2-butoxyethoxy)ethanol	14

e. LVP-VOC s in Architectural Coatings Will Evaporate and Become Available to Form Ozone in the Atmosphere

The ARB staff has carefully examined the issue of whether LVP-VOCs used in architectural coatings will evaporate into the atmosphere and become available to form ozone. As part of this evaluation, staff reviewed a number of indoor air quality studies, which are listed as references at the end of this section. Staff's conclusion is that all or almost all of the LVP-VOCs contained in architectural coatings do eventually volatilize and enter the atmosphere, although in some situations it may take several years for this volatilization to be completed. Furthermore, once these compound initially enter the atmosphere, they may be temporarily adsorbed onto other materials (known as "sinks"), but these VOCs are subsequently desorbed and transported through air exchange into the ambient air.

Before getting into the more technical aspects of air pollution and coatings chemistry, it is useful to consider the issue of LVP-VOCs from a common sense perspective. As mentioned above in section c, in developing the consumer products regulation the ARB staff recognized that whether or not a compound is emitted into the atmosphere is critically dependent not only on the vapor pressure of the individual compound, but also on: (1) the type of product in which the compound is used, (2) the particular characteristics of the product's formulation, and (3) the way in which the product is actually used by consumers in the real world.

In the case of architectural coatings, these products are designed to be spread as a thin film across walls and other surfaces, and then allowed to completely dry in the air. Basically, the way most coatings work is that the solvent in the coating evaporates and leaves behind the other constituents of the coating (*e.g.*, resins and pigment) as a film on the surface. If the solvent did *not* evaporate, the paint would not dry. (This is not true of all coatings, of course. There are a few types of coatings that do not evaporate when they dry: 100 percent solids traffic paints and two-component industrial maintenance coatings, for example, which are either melted as they are applied, or form a film by chemical reaction, respectively.)

Because of this way that architectural coatings are formulated and used, an LVP-VOC exemption for paints is a totally different technical issue than an LVP-VOC exemption for consumer products. Almost all types of paint are designed to stay on a surface for years without being washed off, whereas many consumer products have very different formulation and usage characteristics (such as "down-the-drain" effects). It is a matter of common sense that solvents

used in paint, whether these solvents are LVP-VOCs or non-LVP-VOCs are very likely to evaporate and enter the atmosphere.

This common sense conclusion is supported by the various indoor air quality studies considered by ARB staff (Chang et al, 1997; Chang et al, 1998; Clausen, 1993; Clausen et al, 1991; Censullo et al, 1996; Hodgson, 1999; Tichenor et al, 1991; and Von Der Wal et al, 1997). Some of the LVP compounds in latex paint have been studied indirectly as part of these indoor air quality studies. The most common compounds found in studies of latex paint are propylene glycol, ethylene glycol, and Texanol®. These compounds have different roles in the coatings. For example, Texanol® and 2-(2-butoxyethoxy)ethanol are generally used as coalescing aids, which helps the latex emulsion form a film. Texanol® is water insoluble and is usually added to coatings because it does not immediately evaporate with the water and other water-soluble ingredients. Rather, it temporarily remains associated with the latex particles, softening them and helping them fuse as the paint dries. Propylene glycol and ethylene glycol are typically used in latex paints to help painters maintain a wet edge and to protect the latex paint from freezing. Propylene glycol and ethylene glycol, and 2-(2-butoxyethoxy)ethanol are water soluble, and thus are associated with the aqueous portion of the paint (Dow, undated; Eastman, undated).

In general, the research shows that very significant amounts of these compounds are emitted from coatings as the coatings dry. The rate at which the compounds are emitted appears to depend on a variety of factors, such as the temperature and the substrate to which the coatings are applied. The studies show that for some substrates such as metal, virtually all of the low volatility compounds are emitted completely in a matter of days or weeks. For other more absorbent substrates such as drywall, some percentage of the compounds are emitted in a few days or weeks, but the remainder of the other compounds are emitted much more slowly, and it may take from one to three-and-one-half years before all or almost all of the VOCs are emitted. The studies do not conclusively answer the question of whether 100 percent of these compounds are eventually emitted from paint, but they do clearly demonstrate that very significant amounts of LVP-VOCs are emitted over time, and many researchers believe that virtually all of these compounds are eventually emitted.

Once VOCs are emitted into the air from a coating, some of the emitted VOCs may then be adsorbed onto surfaces, or sinks. Some common indoor sinks include walls, carpets, and furniture. Studies have shown that under certain conditions, some percentage of the VOCs (including LVP-VOCs) found in the air of a test chamber can be adsorbed into sinks, but also that VOCs adsorbed by sinks are eventually re-emitted (*i.e.*, desorbed). As with the issue of whether 100 percent of VOCs eventually evaporate from a newly-painted surface, the studies do not conclusively answer the question of whether 100 percent of the VOCs adsorbed by sinks are eventually re-emitted, but they do clearly demonstrate that very significant amounts of VOCs are desorbed over time. Depending on the type of VOC, the type of sink, the ventilation rate, and various other factors, the desorption time varies, and may be as long as several years for some percentage of the adsorbed VOCs. After desorption has occurred, volatile organic vapors are available for transport to the ambient air via air exchange.

f. U.S. EPA's Test Method 24 Automatically Excludes VOCs That Do Not Evaporate into the Atmosphere

Pigments and resins contained in architectural coatings are left behind on the painted surface as a film after the coating dries. Since many pigments and resins are LVP-VOCs, one might expect that these compounds should receive an exemption. However, the test method for architectural coatings automatically excludes from regulation all VOCs that do not evaporate, thereby rendering it unnecessary to include a special exemption for LVP-VOCs.

The specified test method for measuring the VOC content of architectural coatings has been U.S. EPA's Method 24 (40 CFR, Part 60, Appendix A). First adopted in October 1980, Method 24 has gone through extensive peer-review by industry and government agencies, and is the test method used to enforce the local district rules in California, as well as the U.S. EPA's National Rule for architectural coatings (see 40 CFR Part 60, Appendix A).

Method 24 defines the VOC content in the product. In this test, a sample of paint is held at 110° C for 1 hour. During Method 24 testing of paints, many compounds with vapor pressures less than 0.1 mm Hg at 20° C volatilize, and thus are considered VOCs. Because the sample is weighed before and after this procedure, with the difference in weight representing the weight of the volatile compounds that have evaporated, only those compounds that have evaporated are counted as VOCs for the purposes of determining the sample's VOC content.

Actually, the description in the previous paragraph is an oversimplification, because only some of the volatile compounds are ultimately counted as VOCs under Method 24. The test described above will measure the total "volatile matter content" of the sample. "Volatile matter content" encompasses all compounds that have evaporated during the test, including water and other "unreactive" compounds that are exempt from regulation as VOCs because they have minimal potential to react in the atmosphere to form ozone. To eliminate water and these other compounds from being counted as VOCs, Method 24 specifies that various other tests be performed to identify and subtract these compounds from the final determination of a product's VOC content. The portion of the sample that does not evaporate (*e.g.*, pigment and binder) is not counted as a VOC.

What this means is that, for whatever portion of the compounds in paint (pigments or resins) that do not evaporate and remain in the film (whether that portion consists of LVP-VOCs, non-LVP-VOCs, or non-VOCs), Method 24 will automatically exclude that portion from regulation by not counting the excluded material as a VOC. It is simply unnecessary to provide any additional exemption for LVP-VOCs in paint, beyond what is automatically provided by Method 24.

g. Conclusion

For the reasons discussed above, the ARB staff concluded that it would not be appropriate to include an LVP-VOC exemption in the SCM, and this alternative is not considered to be a feasible alternative.

6. Reactivity-based VOC Limits

Some industry representatives have suggested that, rather than mandating mass-based VOC limits, the ARB should establish reactivity-based VOC limits for architectural coatings. They claim that mass-based controls are not effective and that reactivity-based limits are the only approach to ensure that reformulated products all have equal ozone impacts. Industry also believes that a reactivity-based control strategy is more cost effective than mass-based controls. Therefore, the alternative would be to establish an SCM with reactivity-based VOC limits instead of mass-based VOC limits.

a. Background on VOC Photochemical Reactivity

As part of California's strategy to reduce excess ozone concentrations in non-attainment areas, control of volatile organic compounds (VOCs) is important, particularly in areas rich in ambient concentrations of nitrogen oxides (NO_x), such as urban centers. Control of VOCs has been accomplished traditionally through mass-based reductions. However, since different VOCs react via different chemical mechanisms, different VOCs will have different impacts on ozone formation. This is the principle behind VOC photochemical reactivity (reactivity). In other words, the difference in the chemistry of each VOC, or its reactivity, needs to be considered in the assessment of its impact on ozone formation. Reactivity values allow relative comparisons and assessments of VOCs' ozone formation potentials to be used for regulatory purposes. A general discussion of the chemistry of ozone formation and reactivity issues can be found in the More Reactivity section in Chapter IV.

b. ARB's Plans to Evaluate Reactivity-Based Control Strategies

The ARB is committed to evaluating the feasibility of reactivity-based regulations for certain source categories, including architectural coatings, to determine if, in the future, reactivity-based controls could be developed. As evidence of the Board's commitment, the ARB has funded research projects to improve and refine the science of VOC photochemical reactivity. A partial listing of reactivity research funded by ARB is shown below:

- DEVELOPMENT OF REACTIVITY SCALES VIA 3-D GRID MODELING OF CALIFORNIA OZONE EPISODES. 98-309: University of California, Berkeley.
- IMPROVEMENT OF SPECIATION PROFILES FOR AEROSOL COATINGS. 98-306: California Polytechnic State University Foundation, San Luis Obispo.
- LINKAGES BETWEEN MEASUREMENTS OF MULTIFUNCTIONAL AND POLAR ORGANICS IN CHAMBER STUDIES AND THE AMBIENT ENVIRONMENT. 98-311: University of California, Davis.
- ATMOSPHERIC CHEMISTRY OF SELECTED LINEAR, BRANCHED, AND CYCLIC C₁₀ ALKANE COMPONENTS OF MINERAL SPIRITS. 97-312: University of California, Riverside.

- DEVELOPMENT AND APPLICATION OF IMPROVED METHODS FOR MEASUREMENT OF OZONE FORMATION POTENTIALS OF VOLATILE ORGANIC COMPOUNDS. 97-314: University of California, Riverside.
- UNCERTAINTY ANALYSES OF CHEMICAL MECHANISMS DERIVED FROM ENVIRONMENTAL CHAMBER DATA. 95-331: University of California, Riverside.
- INVESTIGATION OF ATMOSPHERIC REACTIVITIES OF SELECTED STATIONARY SOURCE VOCs. 95-308: University of California, Riverside.
- DEVELOPMENT AND APPLICATION OF AN UPDATED PHOTOCHEMICAL MECHANISM FOR VOC REACTIVITY ASSESSMENT. 92-329: University of California, Riverside.
- PRODUCT STUDIES OF THE ATMOSPHERICALLY IMPORTANT REACTIONS OF ALKENES AND AROMATIC HYDROCARBONS. 94-311: Statewide Air Pollution Research Center, University of California, Riverside.
- EXPERIMENTAL STUDIES OF ATMOSPHERIC REACTIVITIES OF VOLATILE ORGANIC COMPOUNDS. A032-096: University of California, Riverside.
- EXPERIMENTAL INVESTIGATION OF THE ATMOSPHERIC CHEMISTRY OF AROMATIC HYDROCARBONS AND LONG-CHAIN ALKANES. A032-067: University of California, Riverside.
- DEVELOPMENT AND APPLICATION OF AN UP-TO-DATE PHOTOCHEMICAL MECHANISM FOR AIRSHED MODELING AND REACTIVITY ASSESSMENTS. A932-094: University of California, Riverside.
- REVIEW OF THE UPDATED MAXIMUM INCREMENTAL REACTIVITY SCALE OF DR. WILLIAM CARTER. 98-401: Desert Research Institute; Reno, Nevada.

In addition to funding research, in 1996 the Chairman of the ARB established the Reactivity Scientific Advisory Committee (RSAC) to advise the ARB on the science of reactivity. The RSAC is an independent panel of scientists with various areas of expertise in the field of atmospheric chemistry. The RSAC has met four times.

Another advisory group, the Reactivity Research Advisory Committee (RRAC), has also been formed. The RRAC is comprised of consumer product manufacturers, raw material suppliers, and other interested stakeholders. The purpose of the RRAC has been to identify important VOCs used in consumer products that warrant further reactivity characterization. The goal has been to ensure that reactivity regulations being developed for consumer products are based on sound VOC reactivity data. This group has met seven times and has provided valuable input on commercially important VOCs to study further to reliably assess their reactivity. Based on their suggestions, additional research was funded by ARB and completed (see above contract # 95-308) (ARB, 1998a; 2000).

i. Use of reactivity in current regulations

The research funded by the ARB has led to incorporation of VOC reactivity into regulatory strategies. In fact, the ARB was the first regulatory agency to enact a regulation which uses reactivity in a more complex manner than U.S. EPA's "bright-line" approach in their VOC exemption process (ARB, 1990).

The Low Emission Vehicle/Clean Fuels (LEV/CF) Regulations established increasingly stringent standards for emissions of nonmethane organic gases (NMOG), NO_x, carbon monoxide, and formaldehyde. As part of the regulation, to encourage use of alternatively fueled vehicles (AFV), the ARB established a process to account for the differences in reactivity of the NMOG emissions. The regulation allows AFVs to have a higher mass of NMOG emissions as long as the ozone formation potential of the AFV emissions are no more than those of a conventionally fueled vehicle (CFV). Emissions are compared through the use of reactivity adjustment factors (RAFTs). A RAF is defined as the ratio of the exhaust reactivity (per gram) of an AFV to the exhaust reactivity of a comparable CFV. For an AFV, the mass emission rates of NMOG exhaust are adjusted by the RAF prior to comparison with the emission standards specified in the regulation (ARB, 1990).

It is important to note that to calculate RAFTs, the speciated inventory that contributes to ozone formation must be identified and quantified. The LEV/CF Regulations also established the Maximum Incremental Reactivity (MIR) scale as the most appropriate for use in our regulations. To determine the reactivity of exhaust, the emission rate of each NMOG species is converted to mass of ozone using the MIR scale. These are then summed to estimate the reactivity of the entire exhaust sample (ARB, 1990).

ii. Use of Reactivity in Future Regulations

The ARB has adopted an aerosol coatings regulation (title 17, CCR, sections 94520-94528) (ARB, 1999a) that limits the total VOC content of aerosol coatings on a percent-by-weight basis. This regulation, as with all mass-based VOC regulations, does not consider the different reactivities of the VOC ingredients in the product, other than by exempting VOCs that are very low in reactivity. However, as industry has indicated, and as discussed above in section "a" of part 6 of this Chapter, VOCs can differ significantly in their effects on ozone formation (Carter, 1994). Recognizing this concept, as a compliance alternative to this mass-based VOC regulation, ARB staff is developing a voluntary reactivity-based regulation for aerosol coatings for the Board's consideration during 2000. This proposed regulation would limit the total ozone formation potential (*i.e.*, reactivity), rather than the total mass of VOCs in a product.

Developing a reactivity-based regulation for chemically formulated products presents new challenges. For a given consumer products category, such as aerosol coatings, over 100 different VOC ingredients are used in formulations. It is also known that not all VOCs have been thoroughly studied to accurately assess their reactivity (Carter, 1999b). Therefore, to develop a successful reactivity program for chemically formulated products requires the following elements:

- 1) an inventory of completely speciated VOC data for individual products within the source category;
- 2) a scale that allows a comparison of VOC reactivities based on appropriate atmospheric conditions;
- 3) an inventory that consists largely of VOCs that have well-characterized reactivities;
- 4) product sales data that allow weighting of VOC reactivities; and,
- 5) a method to establish limits.

The aerosol coatings category was selected for development of the first consumer product reactivity-based regulation because the above elements are available. A recent survey provided detailed speciated VOC data and sales information. A review of the aerosol coatings data also showed that, on a mass basis, over 90 percent by weight of VOCs reported have been sufficiently studied to allow reliable MIR estimates. These estimates are derived from the MIR scale which was deemed by Dr. Carter to be the most appropriate reactivity scale for use in California (Carter, 1994). The methodology used to calculate reactivity limits is being designed such that the limits will provide equivalent ozone reductions as would be achieved through compliance with the mass-based VOC limits.

ARB staff intends to use this proposed regulation as a pilot project for determining the feasibility of additional reactivity-based regulations.

iii. Reactivity Regulation for Architectural Coatings

As stated above, industry has suggested that reactivity-based limits should be established for architectural coatings (EL RAP, 1998). The ARB believes this may be a viable alternative control strategy in the future for architectural coatings, and we have committed to investigate the feasibility of developing a reactivity-based strategy. The commitment to reactivity-based control strategies is further demonstrated by the proposed reactivity-based regulation for aerosol coatings. However, at this time, a number of issues need to be addressed before this type of control strategy could be developed for architectural coatings.

First of all, one requirement for accurately assessing the reactivity of products and establishing limits is an inventory of fully speciated VOC data for each product. Only with these data can the ozone formation potential be reliably assessed. Although the architectural coatings industry completed a survey in 1998 for their sales and VOC content in 1996, the data provided are not sufficient to establish the total ozone formation potential of the products (ARB, 1999c). It should be further noted that as the survey was being developed in conjunction with industry, there was reluctance to provide the level of detailed VOC speciation that is required for a reactivity program to be viable.

Additionally, some VOCs which are used extensively in architectural coatings do not have well-established reactivity values. A further complication is that some of the VOCs needing further characterization are not easily evaluated using present methodologies (smog chamber experiments) (Carter, 1999b). These VOCs are sometimes referred to as “sticky VOCs” in that, in a chamber, they are difficult to keep in the gas phase, and tend to stick to

chamber walls (Carter, 1999b). However, the ARB is taking steps to address both of these issues. First of all, funding has been earmarked for future studies to help elucidate the mechanism by which the VOCs react in the atmosphere to produce ozone (ARB, 1999c). Data results and the knowledge obtained from these experiments can then be used to reliably estimate the reactivity of these VOCs such that MIR values are more certain. To address the issue of “sticky VOCs,” the ARB is funding research for development of an improved methodology to assess reactivity of VOCs (Carter, 1999b).

In the EL RAP concept paper it is acknowledged that not all VOCs used in architectural coatings have been thoroughly studied to reliably assess their reactivity. It is suggested that, in instances where a reactivity value is unknown, that a reactivity adjustment factor of “one” be used (EL RAP, 1998). The ARB disagrees with the approach of using a comparatively low “default” value. As evidence, using the MIR scale as the basis, reactivities of VOCs can vary by more than an order of magnitude (Carter, 1999a). Even the EL RAP paper acknowledges that a coating formulated with an equal amount of xylenes can potentially produce more than ten times the ozone as one formulated with mineral spirits (EL RAP, 1998). Given this wide range in reactivity, it would be unwise and not protective of air quality to use a low default value. To ensure that a regulation is based on sound science, the ARB believes that these reactivity estimates themselves should be based on the science rather than an arbitrary default value with no scientific basis.

c. Selection of an Appropriate Scale to Compare VOC Reactivities

At a public consultation meeting on May 27, 1998, industry suggested that the MIR scale may not be the most appropriate way to determine the reactivity of architectural coatings. This is because, they contend, the MIR scale depicts conditions when a change in VOC emissions will have the greatest impact on ozone concentrations.

It is true that the MIR scale is designed for conditions where changes in VOC concentration have the greatest impact on ozone concentration. However, before addressing industry’s concern, some background on the development of scales to compare VOC reactivities is appropriate. When considering regulatory control of VOCs using the concept of VOC photochemical reactivity, it is important to assess and to attempt to quantify the impact of each VOC on ozone formation. One tool that allows for ozone measurement is a reactivity scale. Many scales have been proposed to quantify the ozone formation potential of VOCs. The complexity of these scales range from one considering only the hydroxyl-radical (OH) reaction rate constant (see, for example, Darnall *et al.*, 1976) to those that incorporate detailed effects of ozone chemistry and ambient conditions using the box model or the more sophisticated three-dimensional Eulerian model.

The MIR, Maximum Ozone Incremental Reactivity (MOIR), and Equal Benefits Incremental Reactivity (EBIR) are three incremental reactivity scales developed from box models of 39 U.S. urban areas (selection based on conditions described by the U.S. EPA) (Bauges, 1990; Carter, 1994). Incremental reactivity is expressed as the number of additional grams of ozone formed per gram of VOC compound added to the base organic mixture. For the purpose of ozone control, incremental reactivity is used to conveniently compute the ozone formation potential of a VOC when it is readily available for reaction in the troposphere. The

MIR is the incremental reactivity computed for conditions in which the NO_x concentration would maximize the VOC reactivity. The scenario is typical in air parcels of low VOC-to-NO_x ratios, or air parcels in which ozone is most sensitive to VOC changes. These are typical of urban centers in which there are high emissions of NO_x and which the chemistry is VOC-limited. The MOIR is the incremental reactivity computed for conditions that maximize the ozone concentration. The scenario is characterized by moderate VOC-to-NO_x ratios such that the highest ozone concentration is formed. These moderate VOC-to-NO_x ratios are generally encountered as the chemistry is in transition between VOC and NO_x limitations. In this scenario, ozone formation is relatively insensitive to concentrations of VOCs and NO_x, compared to its sensitivity to VOC control in the VOC-limited region and its sensitivity to NO_x control in the NO_x-limited region. The ozone sensitivity to the VOC is studied after the NO_x concentrations are optimized to yield the maximum ozone concentration. The EBIR is the incremental reactivity computed for conditions in which ozone sensitivity to VOC is equal to that of NO_x. The scenario is characterized by higher VOC-to-NO_x ratios such that VOC and NO_x controls are equally effective in reducing ozone. Carter evaluated each of the scales and concluded that, if only one scale is to be used for regulatory purposes, the MIR scale is the most appropriate for California (Carter, 1994).

Although the MOIR is computed for conditions that maximize the ozone concentration, the MOIR and EBIR are more representative of the lower NO_x and higher VOC conditions. In the grid modeling study conducted by McNair *et al.*, (McNair *et al.*, 1992), a 3-D model was applied to a 3-day pollution episode in the Los Angeles Air Basin. The results showed that the MIRs derived from the box models did not perform well in predicting peak ozone sensitivities to individual VOCs, but performed reasonably well in predicting the effects of the VOCs on the integrated exposure to ozone over the air quality standard. The MOIR scale did not compare as well as the MIR scale to either the peak ozone concentration or ozone exposure concentrations greater than the air quality standard. In another study, Bergin *et al.* (Bergin *et al.*, 1995; 1998a) conducted a more direct comparison with the MIR and MOIR scales. The results showed that the metrics compared relatively better with the MIR scale than with the MOIR scale. The results suggest that the MIR scale is most appropriate in areas rich in NO_x.

The ARB proposed using the MIR scale for regulatory applications because the MIR scale reflects reactivities under environmental conditions that are most sensitive to the effects of VOC controls, such as in the South Coast Air Basin. The scale would be most accurate for VOC-limited conditions, in which VOC controls would be most effective. The MIR scale was also found to correlate well to scales based on integrated ozone yields, even in lower NO_x scenarios (McNair *et al.*, 1992; Bergin *et al.*, 1995; 1998a). Currently, the MIR scale is used to derive reactivity adjustment factors in the Low Emission Vehicle/ Clean Fuels regulations. Moreover, the MIR scale tends to predict low reactivities for slowly reacting compounds. The wider range of VOC incremental reactivities in the MIR scale allows better discrimination in a manufacturer's selection of a slower-reactive VOC substitution for a relatively higher-reactive VOC solvent.

d. Next-Generation Environmental Chamber

Industry has suggested that the “next-generation” environmental chamber will determine when a reduction of VOCs in architectural coatings is warranted (Kessler, 1999). They state that development of the SCM should be delayed until the results of the chamber experiments are known (Kessler, 1999).

In 1999, Carter *et al.*, submitted a proposal and received funding to develop a “next-generation” environmental chamber to use for VOC reactivity evaluations (Carter *et al.*, 1999). The objectives of the experiments in the new chamber are to evaluate gas-phase and gas-to-particle atmospheric reaction mechanisms for determining secondary aerosol yields, and to measure VOC reaction products and radical and NO_x indicator species under more realistic environmental conditions (specifically, lower NO_x environments) (Congressional Record, 1998; Carter *et al.*, 1999). The chamber may also improve the reactivity assessments of larger (C₁₀-C₁₂) species that, using current methodologies, tend to stick to chamber walls before they can participate in the gas phase reactions.

ARB staff believes that the new chamber will likely provide improved data and better understanding of VOC reactivity that could ultimately result in an improved ozone control strategy. The ARB has always endeavored to use the best available science when developing regulations, and relevant data from chamber experiments will be evaluated for consideration in future regulatory actions. However, conclusive and complete experimental results will not be available for several years (Carter *et al.*, 1999). Given the timeframes for the additional reductions from architectural coatings, development of the Suggested Control Measure can not be delayed until improved reactivity data are available (Federal Register, 1997). As explained in Chapter IV (see the More Reactivity section), the evidence demonstrates that mass-based controls are effective in reducing ozone, so there is no reason to wait for additional reactivity data to be generated.

Another issue of concern is the reliability of the reactivity estimates of some larger and less volatile VOC species used in architectural coatings. For these compounds, atmospheric chamber experiments are difficult to perform using current methodologies. Because of their low volatility, these compounds are difficult to introduce into the chamber, and once in the chamber, they tend to stick to surfaces instead of participating in the atmospheric reactions of interest. This adds significant uncertainty to the results. The design of the “next-generation” chamber should address some of the problems associated with the compound after it is introduced into the chamber. The design improvements will include larger volume to minimize surface effects, better cleaning between runs to reduce cross contamination, and methods to reduce infiltration of contaminated ambient air. Better methods to study low volatility compounds are being investigated under a current ARB contract with Carter (Carter, 1999b). In summary, the next-generation chamber and new experimental techniques should address some problems associated with chamber testing of the low volatility compounds and improve reactivity estimates.

e. Conclusion

As described in the above sections, the ARB agrees with industry that reactivity-based limits hold promise as a VOC control strategy that may be effective for reducing the ozone formation potential from architectural coatings. However, for reasons also described above, additional data are necessary before assessing the feasibility of a reactivity-based control strategy for architectural coatings. Because additional reductions are needed in the near term, and that historical data indicate mass-based controls effectively reduce O₃, it is necessary to go forward with mass-based VOC limits at this time.

C. DESCRIPTION OF ALTERNATIVES CONSIDERED FEASIBLE

The rationale for selecting and modifying specific components of the proposed SCM to generate feasible alternatives for analysis is based on CEQA's requirement to present "realistic" alternatives, that is, alternatives that can actually be implemented. The following four alternatives are considered to be feasible: a) No Project, b) Extended Compliance Deadlines, c) Further Reduction of VOC Content Limits, and d) Product Line Averaging.

These four alternatives represent the ARB staff's attempt to choose a reasonable range of defined alternatives for additional examination, as required by CEQA. In addition to the alternatives specifically discussed in this chapter, it should be noted that other alternatives were also considered by the ARB staff during the development of the SCM. These alternatives consist of the many variations in the language of the SCM that were considered during the development of the SCM, as different versions of the SCM were distributed to the public, and modifications to the SCM's language that were made in response to comments received from industry and the air districts. The current version of the proposed SCM incorporates many of these suggested changes.

Table V-2 identifies the major components of the SCM and each of the project alternatives. All other components of the SCM not identified in the following subsections or in Table V-2 would also be included in the proposed project alternatives.

1. Alternative A - No Project

This alternative assumes that the SCM will not be adopted. Districts would be subject to the National AIM rule, and some districts may adopt their own architectural coatings rules, which would probably not be consistent with one another. As a result, VOC emissions from architectural coatings may not be further reduced statewide, or may be reduced less than would be the case if the SCM were available as a model rule.

2. Alternative B - Extended Compliance Deadlines

Alternative B would extend all of the effective dates for the VOC content limits to January 1, 2004. The VOC content limits for affected coatings would be identical to those in the current version of the proposed SCM.

3. Alternative C - Further Reduction of VOC Content Limits

Alternative C would further reduce the VOC content limits for affected coatings categories (adoption of the “final” limits as described in Table 1 of Appendix C of the NOP/IS; (see Appendix B of this Draft Program EIR). The other proposed changes in the current proposed version of the SCM (see Appendix A) would be maintained.

4. Alternative D - Product Line Averaging

Alternative D, Product Line Averaging, would be a voluntary program allowing manufacturers to make products that are above the proposed VOC limits in the SCM, if they compensate by reformulating other products below the proposed VOC limits. This alternative would be designed to achieve the same VOC emission reductions as the SCM. A public workshop to discuss this alternative was held on December 14, 1999. Subsequent to the workshop, an averaging committee was formed with representatives from industry, the air districts, and other interested parties. The first averaging committee meeting was held on January 20, 2000.

The averaging program under consideration by ARB staff would be designed to: (1) preserve the emission reductions that would be achieved by the proposed VOC limits in the SCM; (2) maintain the enforceability of district architectural coatings rules; and (3) provide flexibility and a more cost-effective means for manufacturers to comply with district architectural coatings rules. The averaging program would be implemented by including in the SCM a provision allowing manufacturers to choose the option of averaging, in lieu of complying with one or more of the VOC limits in the SCM. The provision under consideration would include an application process, annual reporting requirements, contingency measures for possible shortfalls in emission reductions, and a violations provision to ensure enforceability. However, ARB staff is also willing to consider an alternative program that would provide manufacturers with more flexibility, as long as the program is enforceable and would achieve the same VOC reductions.

The averaging program being considered by ARB staff would differ from the SCAQMD’s averaging program in its Rule 1113 in several respects. First, the ARB’s program would apply to all architectural coatings categories in the SCM (the SCAQMD’s program only applies to 11 categories). Also, the ARB’s program would allow trading of emission reduction credits, an option not included in the SCAQMD’s program. Finally, the ARB’s proposal would be more restrictive in including products already reformulated below the VOC limits in the proposed SCM. Specifically, products that were reformulated below the proposed VOC limits before January 1, 1997, would not be eligible for inclusion in the averaging program, and thus could not generate emission reduction “credits.” This is because the reductions from these products have already been accounted for in the 1996 emission inventory for architectural coatings. These products would be allowed into the averaging program only if they were further reformulated after January 1, 1997, and in this case the baseline for calculating credits would be the VOC content of the products at the time of the post-1997 reformulation.

In contrast, the SCAQMD's averaging program in Rule 1113 would allow any product below the specified limits to be included in its averaging program, regardless of when the product was reformulated. The SCAQMD's averaging program should preserve the emission reductions from Rule 1113 when the final limits become effective, since the final limits are quite low compared to the current VOC levels of existing products. However, using the Rule 1113 averaging approach in the SCM is a problem, because the SCM VOC limits are largely based on SCAQMD's interim limits and are less stringent than the SCAQMD final limits. In this situation, using the Rule 1113 averaging approach may not preserve the emission reductions that would be achieved by the proposed SCM limits. Therefore, the ARB staff is not considering using the Rule 1113 averaging approach in the proposed SCM.

We believe that allowing companies the option to average would provide flexibility for industry, and would improve the cost-effectiveness of the rule. During the 12/14/99 and 1/20/00 meetings to discuss the averaging proposal, however, it was clear to ARB staff that significant difficulties exist in designing an averaging program that would meet the goals described above, would be practical to implement on a statewide basis, and would be acceptable to industry, the districts, and the U.S. EPA. It is not certain that these difficulties can be resolved in a timely manner, and therefore the project proposed by ARB staff is an SCM without an averaging provision. If these difficulties can be resolved before the scheduled May 25, 2000, Board meeting to consider the SCM, the ARB staff will propose the inclusion of an averaging provision in the final version of the SCM.

Finally, it should be noted that the ARB's technical analysis contained in this Draft Program EIR applies whether or not an averaging provision is included in the SCM. In other words, the ARB's analysis demonstrates that each of the VOC limits contained in the SCM is independently feasible as a stand-alone, separate limit. Although the final text of the SCM may include an averaging provision, each of the VOC limits in the SCM—and the SCM as a whole—is feasible with or without an averaging provision, and the technical analysis does not in any way depend on the existence of averaging in the SCM. Similarly, the environmental analysis in the ARB's Draft Program EIR is equally applicable to an SCM that contains an averaging provision, as well as an SCM that does not contain an averaging provision. This is because for each of the possible environmental impacts analyzed in the Draft Program EIR, the analysis assumes as a worst-case scenario that averaging will not occur.

To summarize, the ARB staff believes that averaging would make the rule more cost-effective, but the existence or absence of averaging does not affect either the ARB's analysis of the technical feasibility of VOC limits in the SCM, or the ARB's environmental analysis for the SCM.

D. COMPARISON OF THE ALTERNATIVES

The Initial Study (see Appendix B) identified those environmental topics where the SCM could potentially cause adverse environmental impacts. Further evaluation of these topics in Chapter IV of this Draft Program EIR reveals that there would be no significant impacts from implementation of the SCM.

The following subsections briefly describe potential environmental impacts that may be generated by each project alternative. Each environmental topic summary contains a brief description of the environmental impacts for each project alternative compared to impacts resulting from implementing the proposed SCM. Potential impacts for the environmental topics are quantified where sufficient data are available. A comparison of the impacts for each of the environmental topics is summarized in Table V-4 and the alternatives are ranked in Table V-5.

1. Air Quality

Alternative A, the No Project Alternative, assumes that the SCM will not be adopted. The existing architectural coatings rules throughout California would remain in effect, and the National AIM Rule would remain in effect. Districts would be free to inconsistently adopt their own architectural coatings rules without any guidance from the SCM. As a result, up to approximately 11 tons per day of VOC emission reductions from architectural coatings would not be achieved throughout California (excluding the SCAQMD). This scenario would potentially jeopardize the ability of districts to meet and maintain federal and State ozone standards.

Alternative B, Extended Compliance Deadlines, would extend the VOC content limits to January 1, 2004. The VOC content limits for affected coatings would be identical to those proposed in the current version of the SCM. As shown in Table V-3, this alternative would result in estimated daily VOC emission reductions by the year 2004 of 11 tons per day. This alternative would ultimately achieve the same VOC emission reductions as the SCM. However, the VOC emission reductions for all categories except IM coatings would be achieved one year later.

Alternative C, Further Reduction of VOC Content Limits, would require affected coatings categories to meet the final VOC content limits as described in the June 10, 1999, version of the SCM. As shown in Table V-3, this alternative would achieve VOC emission reductions of approximately 24 tons per day by the year 2008, or an additional 13 tons per day VOC emission reductions than the proposed project.

Alternative D, Product Line Averaging, would add a voluntary averaging program to the SCM. As explained previously, the averaging program would be designed to achieve the same VOC emission reductions as the proposed SCM. Accordingly, Table V-3 shows that this alternative would achieve VOC emission reductions of 11 tons per day by the year 2004, the same as the proposed SCM.

2. Water

a. Water Demand

Alternative A assumes that the SCM will not be adopted. The water demand impacts associated with the use of current coatings would remain constant under the No Project Alternative. As a result of not implementing the proposed VOC content limits, which are anticipated to be met using more waterborne technology, this alternative would have less water

demand impacts compared to the proposed project. Thus, Alternative A would not create any new or additional water demand impacts.

Alternative B would extend the VOC content limits to January 1, 2004. Since the affected coatings categories will be reformulated with the same waterborne technology to meet the VOC content limits, this alternative would result in similar insignificant water demand impacts as the proposed project, but the impacts would occur one year later.

Alternative C would implement the final VOC content limits for affected coatings categories as described in the June 10, 1999, version of the SCM. The final VOC content limits may require the increased use of waterborne technology. However, the worst-case scenario analyzed in the Draft Program EIR, that all affected coatings would be reformulated using waterborne technology, showed that water demand impacts were insignificant. Furthermore, the SCAQMD, in its Supplemental Environmental Assessment for Rule 1113 (SCAQMD, 1999), found that water demand impacts associated with implementation of the final VOC limits were insignificant. (Rule 1113 is very similar to the June 10, 1999, version of the SCM circulated with the NOP.) Therefore, Alternative C would result in similar insignificant water demand impacts as those associated with implementation of the SCM.

Alternative D would add a voluntary averaging provision to the SCM. Since the affected coatings will be reformulated with the same waterborne technology to meet the VOC content limits, this alternative would result in similar insignificant water demand impacts as the proposed project.

b. Water Quality

Alternative A assumes that the SCM will not be adopted. No change in the current quantities of coatings entering the sewer systems, storm drainage systems, or groundwater within California should occur under the No Project Alternative because current practices are expected to be maintained. Thus, Alternative A would not create any new or additional water quality impacts.

Alternative B would extend the SCM VOC content limits to January 1, 2004. However, the same low-VOC technology used to meet the SCM VOC content limits will be used to meet the later Alternative B VOC content limits. Therefore, Alternative B would result in similar insignificant water quality impacts (*e.g.*, wastewater, storm water, and groundwater) as the proposed project, but the impacts would occur one year later.

Alternative C would further reduce the VOC content limits for affected coatings categories as described in the June 10, 1999, version of the SCM. The final VOC content limits may require the increased use of waterborne technology. However, the worst-case scenario analyzed in the Draft Program EIR, that all affected coatings would be reformulated using waterborne technology, showed that water quality impacts were insignificant. Furthermore, the SCAQMD, in its Supplemental Environmental Assessment for Rule 1113 (SCAQMD, 1999), found that water quality impacts associated with implementation of the final VOC limits were insignificant. (Rule 1113 is very similar to the June 10, 1999, version of the SCM circulated with the NOP.) Therefore,

Alternative C would result in similar insignificant water quality impacts as those associated with implementation of the SCM.

Alternative D would add a voluntary averaging program to the SCM. However, the same low-VOC technology used to meet the SCM VOC content limits will be used to meet the requirements under Alternative D. Therefore, Alternative D would result in similar insignificant water quality impacts (e.g., wastewater, storm water, and ground water) as the proposed project.

3. Public Services

a. Public Facility Maintenance

The No Project Alternative would not require any changes to coatings application practices done for maintenance purposes at public facilities. Thus, Alternative A would not create any new or additional public facility maintenance impacts.

Alternative B would extend the effective date of the VOC content limits to January 1, 2004. However, the same low-VOC technology used to meet the SCM VOC content limits will be used to meet the later Alternative B VOC content limits. Therefore, Alternative B would result in similar insignificant public facility maintenance impacts as the proposed project, but the impacts would occur one year later.

Alternative C would further reduce the VOC content limits for affected coatings categories as described in the June 10, 1999, version of the SCM. As a result, end-users would be required to use coatings with a lower VOC content. However, based on the SCAQMD's technology assessment for Rule 1113 (SCAQMD, 1999), these lower VOC coatings perform as well as higher VOC coatings. (Rule 1113 is very similar to the June 10, 1999, version of the SCM circulated with the NOP.) Therefore, Alternative C would result in similar insignificant public facility maintenance as those associated with implementation of the SCM.

Alternative D would add a voluntary averaging program to the SCM. However, the same low-VOC technology used to meet the SCM VOC content limits will be used to meet the requirements of Alternative D. Therefore, Alternative D would result in similar insignificant public facility maintenance impacts as the proposed project.

b. Fire Protection

The No Project Alternative will not change the current impacts on fire departments. Districts would be subject to the National AIM Rule unless they decided to adopt lower VOC content limits. This would mean the continued use of coatings that contain NFPA 3 flammable solvents such as toluene, xylenes, MEK, mineral spirits, and others. Therefore, Alternative A would not create any new or additional fire department impacts.

Alternative B would extend the effective date of the VOC content limits to January 1, 2004. To comply with the VOC content limits in the SCM, it is expected that some resin manufacturers and coatings formulators will use waterborne technology containing less

TABLE V-2
THE SCM AND PROJECT ALTERNATIVES¹

Coating Category	Proposed SCM or Alternative D - Product Line Averaging ³		Alternative A - No Project ²	Alternative B - Extended Compliance Deadlines		Alternative C - Further Reduction of VOC Content Limits	
	Proposed Limit (G/L)	Compliance Dates	Current Limit (G/L)	Proposed Limit (G/L)	Compliance Dates	Proposed Limit (G/L)	Compliance Dates
Flat Coatings	100	01/01/03	250	100	01/01/04	50	07/01/08
Nonflat Coatings	150	01/01/03	250	150	01/01/04	50	07/01/06
Lacquers	550	01/01/03	680	550	01/01/04	275	01/01/05
Floor Coatings	100	01/01/03	400	100	01/01/04	50	07/01/06
Industrial Maintenance Coatings	250	01/01/04	420	250	01/01/04	100	07/01/06
Primers, Sealers, and Undercoaters	200	01/01/03	350	200	01/01/04	100	07/01/06
Quick-Dry Enamels	250	01/01/03	400	250	01/01/04	50	07/01/06
Quick-Dry Primers, Sealers, and Undercoaters	200	01/01/03	450	200	01/01/04	100	07/01/06
Rust Preventative Coatings	400	01/01/03	400	400	01/01/04	100	07/01/06
Stains	250	01/01/03	350	250	01/01/04	-----	-----
Waterproofing Sealers	250	01/01/03	400	250	01/01/04	-----	-----

- 1) Grams of VOC per liter of coating, less water and less exempt compounds
- 2) Under the No Project alternative, the "current limit" would be the limits (if any) that are currently applicable in each district (see Appendix B).
- 3) Alternative D – Although Product Line Averaging would allow some products to exceed the proposed VOC limits, the overall emission reductions achieved would, in the aggregate, equal the reductions achieved if all products met the proposed limits.

TABLE V-3
COMPARISON OF VOC EMISSION REDUCTIONS
FROM THE SCM AND THE PROJECT ALTERNATIVES (tons per day)*

Year Reductions Achieved	Proposed SCM or Alternative D (Product Line Averaging)	Alternative A (No Project)	Alternative B (Extended Compliance Deadlines)	Alternative C (Further Reduction of VOC Content Limits)
2003	8.32	0	0	11.30
2004	2.98	0	11.30	↓
2008+	↓	0	↓	13.29
TOTAL	11.30	0	11.30	24.59

* Excludes SCAQMD

↓ = Same amount of VOC emission reduction obtained as previous years.

flammable solvents. The exception to this would be the use of acetone in lacquer, floor coating, and waterproofing sealer reformulations. However, fire departments treat all NFPA 3 flammable liquids the same. Because the same replacement and coalescing solvents used to meet the SCM VOC content limits would be used to meet the Alternative B VOC content limits, Alternative B would result in similar insignificant impacts to fire departments as the SCM, but the impacts would occur one year later.

Alternative C would further reduce the VOC content limits for affected coatings categories as described in the June 10, 1999, version of the SCM. The final VOC content limits may require the increased use of waterborne technology. Manufacturers would be required to reformulate all solvent-borne coatings containing more flammable solvents with waterborne technology containing less flammable solvents (e.g., diisocyanates, Texanol, propylene glycol, and ethylene glycol). Therefore, Alternative C would result in fewer fire department impacts than would be expected from implementation of the SCM.

Alternative D would add a voluntary averaging program to the SCM. To comply with the VOC content limits in the SCM, it is expected that some resin manufacturers and coatings formulators will use waterborne technology containing less flammable solvents. The exception to this would be the use of acetone in lacquer, floor coating, and waterproofing sealer reformulations. However, fire departments treat all NFPA 3 flammable liquids the same. Because the same replacement and coalescing solvents used to meet the SCM VOC content limits would be used to meet the Alternative D provisions, Alternative D would result in similar insignificant impacts to fire departments as the SCM.

4. Transportation/Circulation

The No Project Alternative would not require any changes to existing coatings manufacturing processes or coatings application practices. The volume of traffic or traffic circulation patterns associated with the manufacturing, distribution, and use of architectural coatings would not change under Alternative A. Thus, Alternative A would not create any new or additional transportation/circulation impacts.

Alternative B would extend the effective date of the VOC content limits to January 1, 2004. However, the same replacement and coalescing solvents used to meet the SCM VOC content limits would be used to meet the Alternative B VOC content limits. Thus, any additional trips associated with the potential disposal of reformulated low-VOC waterborne coatings due to freeze-thaw, shelf-life, or pot-life problems would be the same as for the SCM. Therefore, Alternative B would result in similar insignificant transportation/circulation impacts as the proposed project, but the impacts would occur one year later.

Alternative C would further reduce the VOC content limits for affected coatings categories as described in the June 10, 1999, version of the SCM. The final VOC content limits may require the increased use of waterborne technology. Thus, any additional trips associated with the disposal of reformulated low-VOC waterborne coatings due to freeze-thaw, shelf-life, or pot-life problems could potentially be greater than the SCM. However, the worst-case scenario analyzed in the Draft Program EIR, that all affected coatings would be reformulated using waterborne technology, showed that transportation/circulation impacts were insignificant. Furthermore, the SCAQMD, in its Supplemental Environmental Assessment for Rule 1113 (SCAQMD, 1999), found that transportation/circulation impacts associated with implementation of the final VOC limits were insignificant. (Rule 1113 is very similar to the June 10, 1999, version of the SCM circulated with the NOP.) Therefore, Alternative C would result in similar insignificant transportation/circulation impacts as those associated with implementation of the SCM.

Alternative D would add a voluntary averaging program to the SCM. However, the same replacement and coalescing solvents used to meet the SCM VOC content limits would be used to meet the Alternative D requirements. Thus, any additional trips associated with the potential disposal of reformulated low-VOC waterborne coatings due to freeze-thaw, shelf-life, or pot-life problems would be the same as for the SCM. Therefore, Alternative D would result in similar insignificant transportation/circulation impacts as the proposed project.

5. Solid Waste/Hazardous Waste

The No Project Alternative would not require any changes to existing coatings manufacturing processes or coatings application practices. The volume of solid waste/hazardous waste generated from the manufacturing, distribution, and use of architectural coatings would not change under Alternative A. Thus, Alternative A would not create any new or additional solid waste/hazardous waste impacts.

Alternative B would extend the effective date of the VOC content limits to January 1, 2004. However, the volume of solid waste/hazardous waste generated from the manufacturing, distribution, and use of architectural coatings would be identical to that generated by the SCM. Therefore, Alternative B would result in similar insignificant solid waste/hazardous waste impacts as the SCM, but the impacts would occur one year later.

Alternative C would further reduce the VOC content limits for affected coatings categories as described in the June 10, 1999, version of the SCM. The final VOC content limits may require the increased use of waterborne technology. Thus, there could be potential additional coatings landfilled as a result of freeze-thaw, shelf life, or pot-life problems associated with the use of reformulated low-VOC waterborne coatings. However, the worst-case scenario

analyzed in the Draft Program EIR, that all affected coatings would be reformulated using waterborne technology, showed that solid waste/hazardous waste impacts were insignificant. Furthermore, the SCAQMD, in its Supplemental Environmental Assessment for Rule 1113 (SCAQMD, 1999), found that solid waste/hazardous waste impacts associated with implementation of the final VOC limits were insignificant. (Rule 1113 is very similar to the June 10, 1999, version of the SCM circulated with the NOP.) Therefore, Alternative C would result in similar insignificant solid waste/hazardous waste impacts as those associated with implementation of the SCM.

Alternative D would add a voluntary averaging program to the SCM. However, the volume of solid waste/hazardous waste generated from the manufacturing, distribution, and use of architectural coatings would be the same as that generated by the SCM. Therefore, Alternative D would result in similar insignificant solid waste/hazardous waste impacts as the SCM.

6. Hazards

a. Risk of Upset

The No Project Alternative will not change the current risk of upset impacts associated with the manufacture, distribution, and use of architectural coatings. Districts would be subject to the National AIM Rule unless they decided to adopt lower VOC content limits. This would mean the continued use of coatings that contain flammable solvents such as toluene, xylene, MEK, mineral spirits, and others. Thus, Alternative A would not create any additional risk of upset impacts.

Alternative B would extend the effective date of the VOC content limits to January 1, 2004. To comply with the VOC content limits in the SCM, it is expected that some resin manufacturers and coatings formulators will use waterborne technology containing less flammable solvents. The exception to this would be the use of acetone in lacquer, floor coating, and waterproofing sealer reformulations. However, as mentioned above, fire departments treat all NFPA 3 flammable liquids the same. For some coatings categories (IM and floor coatings), more toxic but less flammable solvents, such as TDI, MDI, and HDI, may be used to meet the VOC content limits of the SCM. However, the use of these solvents, when balanced against the use of more flammable but less toxic conventional solvents, would result in similar insignificant risk of upset impacts as the proposed project. The same replacement and coalescing solvents used to meet the SCM VOC content limits would be used to meet the Alternative B VOC content limits. Therefore, Alternative B would result in similar insignificant risk of upset impacts as the proposed project, but the impacts would occur one year later.

Alternative C would further reduce the VOC content limits for affected coatings categories as described in the June 10, 1999, version of the SCM. The final VOC content limits may require the increased use of waterborne technology. In the context of flat, nonflat, and rust preventative coatings, resin manufacturers and coatings formulators would be replacing current coalescing solvents such as EGBE with less toxic and less flammable solvents such as Texanol and propylene glycol in their waterborne formulations. Conversely, in the context of IM coatings, coatings formulators would be incrementally increasing the use of two-component polyurethane waterborne systems containing toxic solvents such as TDI, HDI, and MDI.

Therefore, when balancing the loss of solvents that are more toxic and more flammable against the incremental increase in the use of certain coatings containing more toxic solvents, Alternative C would result in similar insignificant risk of upset impacts as the proposed project.

Alternative D would add a voluntary averaging program to the SCM. To comply with the VOC content limits in the SCM, it is expected that some resin manufacturers and coatings formulators will use waterborne technology containing less flammable solvents. The exception to this would be the use of acetone in lacquer, floor coating, and waterproofing sealer reformulations. However, as mentioned above, fire departments treat all NFPA 3 flammable liquids the same. For some coatings categories (IM and floor coatings), more toxic but less flammable solvents, such as TDI, MDI, and HDI, may be used to meet the VOC content limits of the SCM. However, the use of these solvents, when balanced against the use of more flammable but less toxic conventional solvents, would result in similar insignificant risk of upset impacts as the proposed project. The same replacement and coalescing solvents used to meet the SCM VOC content limits would be used to meet the Alternative D requirements. Therefore, Alternative D would result in similar insignificant risk of upset impacts as the proposed project.

b. Human Health

Under the No Project Alternative, districts would be subject to the National AIM Rule unless they decided to adopt lower VOC content limits. This would mean the continued use of coatings that contain toxic solvents such as toluene, xylene, MEK, mineral spirits, and others. Thus, Alternative A would not create any additional human health impacts.

Alternative B would extend the effective date of the VOC content limits to January 1, 2004. It is anticipated that the same replacement and coalescing solvents used to meet the SCM VOC content limits would be used to meet the Alternative B VOC content limits. However, in the context of compliant two-component, waterborne IM systems containing TDI, HDI, and MDI, since formulators have additional time to develop coatings, they may be able to formulate systems containing less toxic compounds or develop better application techniques to further reduce exposure to these compounds. Therefore, Alternative B could result in slightly fewer human health impacts as compared to the insignificant health impacts of the SCM.

Alternative C would further reduce the VOC content limits for affected coatings categories as described in the June 10, 1999, version of the SCM. The final VOC content limits may require the increased use of waterborne technology. In the context of flats, nonflats, and rust preventative coatings, resin manufacturers and coatings formulators would be replacing current coalescing solvents such as EGBE with less toxic solvents such as Texanol and propylene glycol in their waterborne formulations. Conversely, in the context of IM coatings, coatings formulators would be incrementally increasing the use of two-component polyurethane waterborne systems containing toxic solvents such as TDI, HDI, and MDI. Therefore, when balancing the loss of solvents that are less toxic against the incremental increase in the use of coatings containing more toxic replacement solvents, Alternative C would result in similar insignificant human health impacts as the proposed project.

Alternative D would add a voluntary averaging program to the SCM. It is anticipated that the same replacement and coalescing solvents used to meet the SCM VOC content limits would be used to meet the Alternative D requirements. Therefore, Alternative D would result in similar insignificant human health impacts as the proposed project.

E. CONCLUSION

Pursuant to CEQA Guidelines §15126.6(d), a matrix displaying the major characteristics and significant environmental effects of each alternative may be used to summarize the comparison. Table V-4 lists the alternatives considered by the ARB and how they compare to the SCM. Table V-5 presents a matrix that lists the significant adverse impacts as well as the cumulative impacts associated with the proposed project and the project alternatives for all environmental topics analyzed. The table also ranks each impact section as to whether the proposed project or a project alternative would result in greater or lesser impacts relative to one another.

Pursuant to CEQA Guidelines §15126.6(e)(2), if the environmentally superior alternative is the “no project” alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives. Since the No Project alternative (Alternative A) would not ultimately achieve the long-term air quality benefits (*e.g.*, VOC reductions) of the SCM, it is not the environmentally superior alternative.

Following is a brief explanation of why the ARB staff is proposing to recommend the approach specified in the SCM for adoption by the Board, instead of Alternatives A, B, C, or D. Alternative A (No Project) is not favored by staff because it would likely result in fewer emission reductions than the SCM, and most of California needs additional emission reductions to achieve and maintain air quality standards. In addition, without the SCM, districts who decided to adopt architectural coatings rules would probably adopt rules that would be inconsistent with each other. Such inconsistency among the districts is not good because it is confusing for coatings manufacturers and distributors, creates enforcement difficulties, and results in increased costs for inventory management.

Alternative B is not favored by ARB staff because staff believes that the VOC limits in the SCM are feasible to achieve by January 1, 2003 (January 1, 2004, for IM coatings), and that it is not necessary to allow additional time to comply. Both the federal and California Clean Air Acts mandate that air quality standards be attained as expeditiously as practicable, and California’s serious air quality problems require that any delay in achieving emission reductions must be technically or economically justified. Based on all of the information received to date, staff does not believe such a delay is warranted.

Alternative C (adoption of the final limits proposed in the June 10, 1999, version of the SCM) is not favored by ARB staff due to the need to focus limited staff resources on the technical, environmental, and economic issues associated with adoption of the interim limits.

Alternative D (product line averaging), as discussed previously, is not favored by ARB staff at this time because of difficulties in resolving the complexities associated with a statewide averaging program. If the ARB staff, in consultation with the districts and the affected industry, is able to resolve these

difficulties in a timely manner, ARB staff will propose the inclusion of a product line averaging program in the final version of the SCM.

The ARB staff believes that the SCM is necessary to achieve the further VOC reductions needed to attain State and national ambient air quality standards, and encourage statewide uniformity of district architectural coatings rules. Otherwise, districts will need to identify other source categories from which to reduce VOC emissions. This may be difficult to do. Assuming that the Board approves the SCM, the ARB staff intends to begin work on developing lower VOC content limits for architectural coatings. The ARB staff intends to use the final VOC content limits in SCAQMD's Rule 1113 as a model for proposing lower VOC content limits in the SCM.

TABLE V-4
COMPARISON OF POTENTIALLY SIGNIFICANT ENVIRONMENTAL IMPACTS
OF THE SCM TO THE ALTERNATIVES

Environmental Topic	Alternative A (No Project)	Alternative B (Extended Compliance Deadlines)	Alternative C (Further Reduction of VOC Content Limits)	Alternative D (Product Line Averaging)	Mitigation Measures
Air Quality	Significant, greater than the SCM	Not Significant, equivalent to the SCM	Not Significant, less than the SCM	Not significant, equivalent to the SCM	None Required
Water Demand	Not Significant, less than the SCM	Not Significant, equivalent to the SCM	Not Significant, greater than the SCM	Not significant, equivalent to the SCM	None Required
Water Quality	Not Significant, less than the SCM	Not Significant, equivalent to the SCM	Not Significant, greater than the SCM	Not significant, equivalent to the SCM	None Required
Public Resources Public Facility Maintenance	Not Significant, less than the SCM	Not Significant, equivalent to the SCM	Not Significant, greater than the SCM	Not significant, equivalent to the SCM	None Required
Fire Protection	Not Significant, equivalent to the SCM	Not Significant, equivalent to the SCM	Not Significant, less than the SCM	Not significant, equivalent to the SCM	None Required
Transportation/ Circulation	Not Significant, less than the SCM	Not Significant, equivalent to the SCM	Not Significant, greater than the SCM	Not significant, equivalent to the SCM	None Required
Solid/Hazardous Waste	Not Significant, less than the SCM	Not Significant, equivalent to the SCM	Not significant, greater than the SCM	Not significant, equivalent to the SCM	None Required
Hazards Risk of Upset	Not Significant, equivalent to the SCM	Not Significant, equivalent to the SCM	Not Significant, equivalent to the SCM	Not significant, equivalent to the SCM	None Required
Human Health	Not Significant, equivalent to the SCM	Not Significant, less than the SCM	Not Significant, equivalent to the SCM	Not Significant, equivalent to the SCM	None Required

**TABLE V-5
RANKING OF ALTERNATIVES**

Project/ Alter- natives	Air Quality Impacts		Water Demand Impacts		Water Quality Impacts		Public Facility Maintenance Impacts		Fire Protection Impacts		Transportation/ Circulation Impacts		Solid/Hazardous Waste Impacts		Risk of Upset Impacts		Human Health	
	Proj.	Cum.	Proj.	Cum.	Proj.	Cum.	Proj.	Cum.	Proj.	Cum.	Proj.	Cum.	Proj.	Cum.	Proj.	Cum.	Proj.	Cum.
SCM	✓ (1)	✓	✓ (2)	✓	✓ (2)	✓	✓ (2)	✓	✓ (2)	✓	✓ (2)	✓	✓ (2)	✓	✓ (1)	✓	✓ (1)	✓
Alt. A	✓ (3)	✓	✓ (1)	✓	✓ (3)	✓	✓ (1)	✓	✓ (3)	✓	✓ (1)	✓	✓ (1)	✓	✓ (1)	✓	✓ (1)	✓
Alt. B	✓ (2)	✓	✓ (2)	✓	✓ (2)	✓	✓ (2)	✓	✓ (2)	✓	✓ (2)	✓	✓ (2)	✓	✓ (1)	✓	✓ (1)	✓
Alt. C	✓ (1)	✓	✓ (3)	✓	✓ (2)	✓	✓ (3)	✓	✓ (1)	✓	✓ (3)	✓	✓ (3)	✓	✓ (1)	✓	✓ (1)	✓
Alt. D	✓ (1)	✓	✓ (2)	✓	✓ (2)	✓	✓ (2)	✓	✓ (2)	✓	✓ (2)	✓	✓ (2)	✓	✓ (1)	✓	✓ (1)	✓

Notes: The ranking scale is such that 1 represents the least impacts and subsequent higher numbers represent increasingly worse impacts.

The same two numbers in brackets for a specific Impact Section means that these proposals would have the same impacts if implemented.

An X denotes either a project-specific significant adverse impact or cumulative significant adverse impact.

A ✓ denotes no significant adverse impact or no cumulative significant adverse impact.

Proj. = Project-Specific Impacts.

Cum. = Cumulative Impacts.

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